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Consideration of Technology Transfer in Tenure and Promotion

Abstract

Universities face increasing expectations from both the public and elected officials to contribute to the economic development of their respective states, geographical regions, and the country. Technology transfer activities have proven to be a key way to meet these new imperatives. Despite the university's expanded mission and the growing role of tech transfer, the academic community has yet to produce a consistent framework for evaluating faculty activities in technology transfer and their societal benefits. In response to this situation, the authors, working as the APLU Task Force on Tenure, Promotion, and Technology Transfer, surveyed US and Canadian universities to ascertain current approaches for defining technology transfer activities and recognizing them in assessing faculty performance. Building on the results of that survey, the authors offered the following five recommendations: 1) university policy statements should acknowledge the merit of technology transfer as part of the university's work, while including safeguards against conflicts of interest or commitment; 2) technology transfer activities should be explicitly included among the criteria relevant for promotion and tenure at the university, college, and department levels, as appropriate to the respective disciplines; 3) technology transfer activities should be an optional component of the review process, one that will be rewarded when present but not seen as a requirement for everyone; 4) recognizing the unique character of technology transfer, the criteria should be flexible enough to encompass high-quality work in many forms of creative expression; and 5) technology transfer activities should be evaluated for intellectual contribution and expected social benefit consistent with the accepted process of peer review and without reliance on artificial metrics.

Keywords

Conflict management, Faculty review, Technology transfer evaluation, Tenure and promotion

Disciplines

Higher Education | Higher Education Administration

Comments

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CONSIDERATION OF TECHNOLOGY TRANSFER IN TENURE AND PROMOTION

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Universities face increasing expectations from both the public and elected officials to contribute to the economic development of their respective states, geographical regions, and the country. Technology transfer activities have proven to be a key way to meet these new imperatives. Despite the university's expanded mission and the growing role of tech transfer, the academic community has yet to produce a consistent framework for evaluating faculty activities in technology transfer and their societal benefits. In response to this situation, the authors, working as the APLU Task Force on Tenure, Promotion, and Technology Transfer, surveyed US and Canadian universities to ascertain current approaches for defining technology transfer activities and recognizing them in assessing faculty performance. Building on the results of that survey, the authors offered the following five recommendations: 1) university policy statements should acknowledge the merit of technology transfer as part of the university's work, while including safeguards against conflicts of interest or commitment; 2) technology transfer activities should be explicitly included among the criteria relevant for promotion and tenure at the university, college, and department levels, as appropriate to the respective disciplines; 3) technology transfer activities should be an optional component of the review process, one that will be rewarded when present but not seen as a requirement for everyone; 4) recognizing the unique character of technology transfer, the criteria should be flexible enough to encompass high-quality work in many forms of creative expression; and 5) technology transfer activities should be evaluated for

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intellectual contribution and expected social benefit consistent with the accepted process of peer review and without reliance on artificial metrics.

Key words: Technology transfer evaluation; Faculty review; Tenure and promotion; Conflict management

BACKGROUND

Over the past several decades, the historical tripartite mission of a public research university to teach, research, and perform service has been expanded to include economic development and various forms of engagement. This expansion highlights the contributions of the university to economic vitality and societal well-being. Many campuses have placed even greater emphasis on the critical economic development dimension of their mission since 2008 as a university response to help boost the economy out of the downturn of the Great Recession.

Given this context, faculty activities in technology transfer and the commercialization of ideas growing out of faculty research can be very much the proper work of the university and a contribution to its mission. The questions remaining are whether an awareness of the value that technology transfer contributes has been incorporated into the language governing faculty reward and recognition and whether technology transfer activities are duly considered in the processes of faculty reviews for tenure and promotion, and if so, how.

The Association of Public and Land-grant Universities (APLU) constituted a Task Force on Tenure, Promotion, and Technology Transfer (TPTT) in August 2014 and charged it with surveying current practices at universities and making recommendations for APLU member institutions. The authors of this article were members of that task force, and this article is adapted from their final report to the APLU. We here discuss the recommendations that emerged, which are intended to be useful to universities considering broadening criteria for faculty advancement and changing practices to

include technology transfer explicitly as one form of contribution for those faculty members to whom it pertains.

There is no iron-clad definition of “technology transfer” that fits the full rich panoply of university research with its potential economic benefits, both immediate and future. The Association of University Technology Managers (AUTM) offers a definition largely encompassing the work of technology licensing offices: “the process of transferring scientific findings from one organization to another for the purpose of further development and commercialization” (<http://www.autm.net/autm-info/about-tech-transfer/about-technology-transfer/>). We note, however, that some insights from creative research with a potential economic value may not be considered “scientific findings.” The APLU Promotion, Tenure, and Tech Transfer Survey, reviewed by the TPTT, used the phrase “entrepreneurship, innovation, and technology-based economic development activities.” This phrase encompasses a wide range of university endeavors whose outcomes might include written materials, novel business processes, software systems, or even art forms. All of these could lead to economic activity but would not necessarily be considered scientific or technical findings. In this article, “technology transfer” will allow this broader definition.

This examination of practice in tenure and promotion takes place in the context of proposed reforms in patent law aimed at curtailing abusive behaviors by patent assertion entities. The APLU Task Force on Managing University Intellectual Property and the Association of American Universities (AAU) Working Group on Technology Transfer and Intellectual

Property have studied best practices for university management of intellectual property. Recommendations from both reaffirm the societal benefits of technology transfer (1,2). The APLU Task Force emphasizes the importance of managing university intellectual property at public institutions manifestly for the sake of public good. Consistent with the intent of the Bayh-Dole Act, careful university patenting, licensing, and, when necessary, patent enforcement, are essential to promoting dissemination of innovations and realizing social benefit.

The first step of the TPTT was to conduct a survey of the present practices among APLU members in order to clarify to what extent APLU institutions have faculty appointment and review guidelines already in place that address technology transfer. This survey brings up to date the understanding of the national picture on technology transfer activities and tenure and promotion illuminated by Sanberg et al. in a seminal 2014 *PNAS* article, which used web searches to find the language concerning technology transfer in place at 39 institutions (4).

APLU TENURE, PROMOTION, AND TECHNOLOGY TRANSFER SURVEY

The APLU survey was sent to the chief academic officers at 204 US and Canadian universities in November and December of 2014, and responses were received from 51 university officials at 45 institutions. A summary of the responses, which includes the substantive questions posed, is available (3).

In brief, it appears there is a gradually increasing recognition of technology transfer as a valued form of faculty work as well as a development of language enabling its inclusion in faculty reviews, especially in certain areas (notably biology and biomedical sciences, medicine, engineering, computer and information sciences, and physical sciences). At roughly one third of the responding research institutions, consideration of

technology transfer is limited to some areas or units, whereas the majority allows it to be considered in any area where it is appropriate.

The high research and very high research APLU members were somewhat overrepresented among the respondents relative to the APLU as a whole (87% of survey respondents vs. 75% of APLU Canadian and US institutional membership), and perhaps those where technology transfer has been most active were more likely to respond to a survey on practices in this area. About 80% rated entrepreneurship, innovation, and technology-based economic development activities as “important” or “somewhat important” in promotion and tenure. Given that the actual respondents were in the office of the chief academic officers, the central site of adjudication of personnel cases, it speaks to how influential the activities are in observed institutional practices. It is not necessarily a statement concerning the views of any one decision maker, such as the provost or president, who may be more supportive of entrepreneurship than the faculty in general.

Stated another way, only 20% of research institutions rated technology transfer as “important” in promotion and tenure, and none rated it “very important.” The perceived lack of importance suggests that technology transfer consideration may still be lagging and not yet culturally fully accepted in many instances. If there is ambiguity as to the institution’s values and methods of recognition and reward for faculty, early career faculty particularly could shy away from entrepreneurial engagement to concentrate on the time-tested criteria of research and publications, teaching, and service. Even if the body of evidence on which each department will judge a candidate for promotion is explicit, how it weighs those dimensions comparatively may still be murky. In contrast, the empirical evidence from past tenure and promotion decisions conveys a powerful message. If technology transfer has been given little or no consideration in the past, that is what faculty

members will remember and believe. An institution must assert a new position very clearly if it wants to shift expectations.

RECOMMENDATIONS

The engagement of universities with their communities and with private sector businesses to lead innovation, create new processes, and generate beneficial economic activity from university research is now generally deemed an important dimension of a university's mission. Technology transfer activities can also be vital for universities to apply for many federal, state, and private grants and contracts that make university research possible. Therefore, faculty who successfully foster high-quality technology transfer should be explicitly recognized for this work in the tenure and promotion processes. We offer five recommendations to promote due consideration of technology transfer in fields where it is applicable.

Policy Statements Should Acknowledge the Merit of Technology Transfer as Part of the University's Work, While Including Safeguards Against Conflicts of Interest or Commitment

While faculty in applied areas may understand the character of the contribution and the creativity and energy required for meaningful technology transfer, faculty in other areas may view it with suspicion. It is not enough just to allow the faculty in one department to assert their own sense of value in votes on personnel actions, as others outside that department may tacitly dismiss technology transfer, and this can create a climate that inhibits the growth of entrepreneurial activities and their spread to other pertinent areas. The topic of technology transfer should be put on the table by the university so that a widespread understanding of its proper place in the university can be cultivated even among those who may never engage in

it themselves. Campus-wide policy statements can validate and embrace technology transfer, dispelling any notion that it is aberrant behavior by faculty on the margins of the university.

In addition to the inspiration and reward of seeing university research turned into products and processes with societal benefits, it is important to acknowledge that technology transfer often offers the prospect of individual financial gain, which can lead to conflicts of commitment or interest. Conflicts of commitment occur when a university researcher lets other university commitments suffer without acknowledging and balancing them with the technology transfer work. Conflicts of interest occur, for example, when graduate students or postdoctoral researchers are guided to work on projects that are of benefit to a start-up activity but not to the students' or postdocs' own career development. In a similar vein, a researcher's use of university facilities for the purposes of a private business can constitute an unacceptable diversion of university resources for a private benefit unless that usage is explicitly governed and held to account by a carefully crafted contract.

When properly executed, technology transfer activities are synergistic with a faculty member's role at the university. Universities should therefore maintain policies on conflicts of interest and commitment to manage and reduce the risk of adverse situations arising when faculty engage with external entities. Examples of such unfavorable situations would include confusion over ownership of intellectual property and/or the use or perception of use of university resources for personal or private gain. University conflict management plans should lay out explicit arrangements that address such potential conflicts, thus avoiding the perception of unresolved conflicts and striking a necessary balance for the individual, the individual's department, and the university as a whole. At many universities, potential conflicts have been managed well, benefitting both the faculty investigator and

the university, while allowing a core mission of the university to be advanced. Technology transfer activities should, therefore, be encouraged, and management plans for potential conflicts should be put in place to minimize any negative consequences.

Technology Transfer Activities Should Be Explicitly Included Among the Criteria Relevant for Promotion and Tenure at the University, College, and Department Levels, as Appropriate to the Respective Disciplines

Weighing the university value of technology transfer under the rubrics of research or service does not adequately recognize the unique character of technology transfer work. While technology transfer may involve applied research and is ultimately a service to society, it does not fit tidily in the categories defined by conventional research and service terms. Therefore, imposing the existing conventional criteria can distort the assessment of such activities.

The challenge, then, for technology transfer is very much akin to that encountered in performing and studio arts. Articles in peer-reviewed journals are not the currency of creativity in the arts, and one has to consider other forms of “publication” and find appropriate assessments of their quality and impact. In the arts, assessments can include exhibitions and performances and the stature of the venues in which these activities are performed, in-depth reviews of the work by knowledgeable critics and other artists, contracts with recording companies, or the standing of the museums that have made acquisitions of the works. When possibilities such as these are explicit in the criteria, university-based artists are not channeled into inappropriate confines, and there is flexibility to consult experts in the field to judge the merits of the creative output. Similarly, the evidence of success in technology transfer comes in other forms, and these

must be included in the faculty review process (see below).

Technology transfer, innovation, and entrepreneurship should be cited in the campus-level description of work to be included in consideration for promotion and tenure. Where such activity is appropriate to the discipline, the college- and department-level descriptions of criteria for promotion and tenure should also specify the relevance of technology transfer activities. Colleges or departments should give examples of specific criteria and technology transfer activities pertinent to their domains. Such descriptions and criteria should be developed collaboratively by university administration at all levels and faculty governance bodies. Universities should periodically revisit the criteria in the spirit of continuous improvement, assess whether the criteria are being applied as intended, and revise as appropriate.

Technology Transfer Activities Should Be an Optional Component of the Review Process, One That Will Be Rewarded When Present but not Seen as a Requirement for Everyone

With the many expectations placed on faculty already, the addition of another category, “technology transfer,” would encounter needless resistance from those who do not see its relevance. The introduction of “technology transfer” among the criteria should underline that it opens another legitimate avenue to recognize work that is important for some faculty. It is not another box that everyone must check off in some way.

Recognizing the Unique Character of Technology Transfer, the Criteria Should Be Flexible Enough to Encompass High-Quality Work in Many Forms

Technology transfer can take many forms, depending on the domain, and the university should allow evidence pertinent to each domain to be presented in the tenure and promotion

process. Common indicators for technology transfer are the markers along the road from innovation to commercialization and commercial success, which are frequently made visible by patent activity. In other situations, technology transfer success is evident in a sustained relationship with an industry that arises from seminal university research being extended for commercial development, which can lead to enhanced private–public partnerships. While not exhaustive, some examples of technology transfer evidence are the following:

- Patent disclosures submitted
- Patent filings
- Patents issued
- Licenses executed
- License income received
- Awards for technology transfer impact
- Industry grants
- Internships
- Graduate placements
- Faculty-founded start-up companies
- Student start-up companies
- Software widely adopted

In all cases, the criteria must allow the probing of substance within each context, always with the view that technology transfer is a form of creative expression.

Technology Transfer Activities Should Be Evaluated for Intellectual Contribution and Expected Social Benefit Consistent With the Accepted Process of Peer Review and Without Reliance on Artificial Metrics

For universities to recognize and reward faculty who are making substantive contributions of lasting value, the review process must tap a community of pertinent experts to help judge the quality of the work. In research, review committees look at number and quality of publications and the stature of the publishing journals. In fact, the committees are indirectly

relying on the standing of the reviewers, the quality of the reviews, and the insights and judgment of the editorial boards. Acceptance of a paper by a prestigious journal implies a judgment that the research is worthy of dissemination because it will influence the thinking in the field in some important way, whether immediately or in the future.

Similarly, to evaluate technology transfer activities for their likely societal benefit over time, universities will need to allow for the solicitation of assessments from knowledgeable and respected reviewers with expertise in the field and credentials in technology transfer. There can be a considerable lag between the initial innovation and its achieving its full impact. Often, this means that the faculty review process must weigh the assessments and forecasts of experts whose backgrounds lend credibility to necessarily uncertain projections of the future impact of the work.

As one illustration of the need for such experts, consider patents. Trying to count the number of US patents issued to a faculty member will rarely be meaningful in the tenure decision for an early career faculty member due to a number of reasons. First, the United States Patent and Trademark Office (USPTO) is chronically backlogged, and the length of the process of reviewing the patent application for novelty could mean that—for even a successful application—the patent will not be issued until after the tenure decision must be made. Indeed, given the delay, patents are sometimes licensed while they are still pending. Second, the criteria of the USPTO patent examiners may be quite different from what a university is looking for in a tenure file. Patents can be granted for humble inventions revealing limited new insights and with little economic value to the market. Third, the patent review itself strives to be thorough but may not be the final word. An issued patent can later be challenged in court and found invalid. In sum, a faculty review process must seek independent assessments, under a nondisclosure agreement if necessary,

to gather timely and pertinent information on the likely impact of a patentable invention.

Purely quantitative measures of technology transfer should likewise be used with caution because overreliance on them can be misleading and create potentially counterproductive incentives. For example, if faculty reviews look at the number of patent disclosures with no consideration of the content, it will invite an increased volume of disclosures, including more of dubious merit, at the university's technology transfer office. Counting the number of patent applications filed will say as much about the technology transfer office as it does about the faculty candidate. Patents may be issued, but many never earn enough licensing fees to cover the initial costs of filing. Licensing income received is a more reliable indicator of impact, as it is a statement from "the market," but it can be a long time coming. In short, there are many markers that might be precursors to market impact, but merely counting them can lead to unintended consequences.

In any event, when technology transfer activities are a major component of a promotion and tenure case, an assessment of the impacts of those activities should be obtained from peers in the professional community. The objective is to foresee and assess the magnitude of the public benefit that will flow from a faculty member's technology transfer, innovation, or entrepreneurship and to appropriately recognize the contribution. The indicators of future benefit vary from context to context, and we will not attempt to enumerate them all. Additional work may become available to elaborate on practices of evaluation that have proven effective.

CONCLUSION

A faculty member's accomplishments in technology transfer, innovation, and entrepreneurship are worthy of consideration in the review process for tenure and advancement. High-quality work undertaken to translate

university research into new processes and economic benefits is part of realizing an economic development mission appropriate to a research university, a mission that has assumed increased importance in recent years. Moreover, for many in the public, it is particularly visible and readily understood evidence of the value of research. We recommend, therefore, that university policies and criteria for judging merit include technology transfer as one manifestation of meritorious faculty work as they do for a number of other types of valuable activities that should not be expected to result in refereed publications. As with other forms of faculty work, it is essential that the evaluation of technology transfer activities weigh the likely impact of the work, its quality, and its foreseeable societal benefit. When it is successful, technology transfer can invigorate the university and establish relationships with other private and public sectors that affirm the value of a research university.

APPENDIX: SAMPLES OF PROMOTION AND TENURE LANGUAGE (EXCERPTED FROM THE SURVEY REPORT)

Iowa State University

Research/Creative Activities: Faculty members who engage in research/creative activities are expected to make original contributions that are appropriate to their chosen area of specialization and that are respected by peers within and outside the university: conceptualizing and theorizing in an original way, innovative collection or analysis of empirical data, seeking and obtaining competitive grants and contracts, and relating research to the solution of practical problems.

Extension/Professional Practice: Extension/professional practice distinguishes Iowa State as a land-grant university. Faculty members may

engage in extension/professional practice activities by utilizing their professional expertise to disseminate information outside of the traditional classroom to help improve the knowledge and skills of their clientele (i.e., the publics they serve) or the environment in which they live and work. This work should be related to the faculty member's position responsibilities.

Examples of activities that fall within extension/professional practice include the following:

- Engaging in clinical and diagnostic practice
- Acquiring, organizing, and interpreting information resources
- Engaging in technology transfer
- Consulting
- Serving on agencies or boards because of individual expertise

Since extension/professional practice activities vary greatly among departments, it is the responsibility of each department to identify faculty activities that fall under this category and the appropriate evaluation methods.

Texas A&M

Guidelines for the granting of tenure should include: Research, Creative Activities, and Other Scholarly Endeavors; Patents or Commercialization of Research, where applicable.

4.4.1 Categories of Performance: Creation and dissemination of new knowledge or other creative activities: for most disciplines, this category consists of research and publication. For some disciplines, however, it may include other forms of creative activity. Architectural design, engineering technology, veterinary or medical technology, fiction, poetry, painting, music, and sculpture are examples.

University of Arizona

b. Criteria: Promotion and tenure require excellent performance and the promise of

continued excellence in 1) teaching, 2) service, and 3) research, creative work, and scholarship. The university values an inclusive view of scholarship in the recognition that knowledge is acquired and advanced through discovery, integration, application, and teaching. Given this perspective, promotion and tenure reviews, as detailed in the criteria of individual departments and colleges, will recognize original research contributions in peer-reviewed publications as well as integrative and applied forms of scholarship that involve cross-cutting collaborations with business and community partners, including translational research, commercialization activities, and patents.

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